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ABSTRACT

The historical emergence of industrial arts education, the current attitudes of professionals in regard to philosophy and content, and the debate involving technology education and its implications are summarized in a literature review. The debate within the profession regarding definition, curriculum, and philosophy is of long-standing significance. The industrial arts movement has experienced controversy since the late 1800s. Educators in the field should evaluate the conditions of the changing society and achieve unity in the field of professional technology education. Research is inconclusive as to its impact on curriculum and philosophy. Annotations of 20 studies are provided, after which the following recommendations are made: (1) technology programs should provide technological literacy; (2) there should be a renewed professional involvement in educational programs; (3) educators should conform to state curriculum plans; (4) educators must achieve professionalism to enhance the image of technology education; and (5) continued study of curriculum changes should be pursued to provide guidance and direction. (Twenty-five references are included.) (NLA)

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AN ANNOTATED BIBLIOGRAPHY OF THE LITERATURE DEALING WITH THE DEVELOPMENT OF INDUSTRIAL ARTS EDUCATION, THE CURRENT TRANSITION TO TECHNOLOGY EDUCATION AND THE ATTITUDES/PERCEPTIONS OF PROFESSIONALS IN THE FIELD

by

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INTRODUCTION

During the past ten years the field of industrial arts, stimulated by rapid technological changes, has changed its name and its focus to technology education. Once a discipline that emphasized problem-solving through laboratory projects, it has been striving to become one in which problem-solving and critical thinking skills experience a focus on global situations (White 35). Industrial arts focused on the materials and processes of industry; industrial technology education places emphasis on technology, its effects on society and the effects of people on it (White 33). Currently advocates of both philosophies exist in the public school and are often found in adamant opposition (Baird 15). While there is still considerable disagreement among teachers, teacher educators, and technologists regarding what should be the content of technology programs, a great number of content designs expand on the four technical systems identified in the Jackson's Mill Industrial Arts Curriculum Theory document (Snyder and Hales). This document had a far-reaching influence on curriculum revision in the 1980's and is likely to influence future development for some time (White 20). It is time for all public schools to follow the recommendations of research and adopt a philosophy of technology education that will assist students in becoming technically literate. Through examining the history of the profession and the research

involving the attitudes of professionals and those affected by industrial arts curriculum, a belief in the new technology education may be established and its importance for all students, regardless of their future ambitions, may be realized.

STATEMENT OF THE PROBLEM

Since the introduction of manual training in the 1800's, there has been a continuing debate raging over a variety of issues involving industrial arts education. Conservative educators did not believe manual training had a place in education, while the early professionals in the field fought to establish its rightful position in the system of general education and also fought internal debates over the philosophy and content of the courses taught. This paper will examine the historical emergence of industrial arts and review studies that focus on the current attitudes of professionals and others in touch with industrial arts in regard to curriculum philosophy and content.

PURPOSE OF THE STUDY

For industrial arts/technology education instructors, this is a time of change and growth. It is also a period that requires renewed professional commitment and dedication. The first purpose of this study is to gain a historical perspective involving the origins and evolution of industrial arts. The second purpose is to examine the attitudes of professionals and students in regard to the offerings of

industrial arts. The final purpose is to understand the current debate involving technology education and its implications for industrial arts professionals.

ORGANIZATION

To aid professionals in understanding the current debate involving industrial arts/technology education, the research has been divided into three categories: historical reviews allowing one to gain a perspective into the continuing debate regarding the philosophy and content of courses; studies which have been done to collect data on the attitudinal perceptions of administrators, students, parents and professionals in the field regarding industrial arts; and literature involving curriculum changes resulting from the introduction of the Jackson's Mill document.

LIMITATIONS OF THE STUDY

The earliest literature involving history lacked research data but provided an insightful perspective into the evolution of industrial arts in public education. Many of the studies requested were impossible to locate in the time period allowed and some of them were found in summarized form and included. Although many leaders in the field have written opinion papers regarding technology education and its force in industrial arts education, limited research has been done in the field since its inception in the 1980's. The time restraints of the study also limited its inclusiveness.

GLOSSARY

academic student--one who has taken a combined total of four or more math and science courses in high school excluding general math and general science (Schoonmaker).

curriculum--a structured series of learning outcomes that prescribe the results of instruction (Luetkemeyer).

industrial arts--those courses in general education that deal with industry - its organization, materials, occupations, processes and products - and with the problems resulting from the industrial nature of society.

industry--an economic institution designed to produce goods, services, and information to meet human needs and wants (Indiana Industrial Technology Education Curriculum)

manual training--shop work in woodworking, forging, or machine shop in an effort to develop a student's mechanical abilities (Woodward).

technology--the knowledge of efficient and appropriate action developed by humans to extend their potential for controlling their environment (Indiana Industrial Technology Education Curriculum).

technology education--a general education program organized around a study of communication, construction, manufacturing, and transportation and is concerned with

their technologies, industrial structures, and social/cultural impacts (Indiana Industrial Technology Education Curriculum).

technological literacy--ability to solve identified problems, develop methods for study, and evaluate alternatives in a systematic fashion (White).

vocational education--programs that prepare skilled workers for specific occupations in industry (Barella and Wright).

ANNOTATIONS

Woodward, C.M. Manual Training in Education. London: Walter Scott, 1896.

This book traced the historical development of industrial arts in the public school prior to 1900. Primary focus of this text was the introduction of manual training into the public schools. Woodward was responsible for this development and his book outlined the rationale and history of his decision to build "a symmetrical course in tool-work which should be strictly educational." He explained the impact of this course and its relationship to the society of his time. Through reading selected portions of this text an insight into the thinking of early leaders in industrial arts can be gained.

Anderson, F.F. History of Manual and Industrial School Education. New York: D. Appleton, 1926.

In this book Anderson traced the early roots of industrial arts in education. The history from pre-civil war to the early turn of the century was covered and documented the important shift from common schools to a systematic approach to general education, including manual training (industrial arts) education. According to Anderson, John Runkle (President of the Massachusetts Institute of Technology) went to the Philadelphia Centennial Exposition in 1876 and became acquainted with Victory Della Vos, Director of the Imperial Technical School of Moscow. This Russian was in charge of an exhibit that displayed a systematic approach for developing skills in the use of tools and materials for engineers. Runkle viewed this system as the "arts" or general elements that underlie all industrial pursuits and had the insight to see greater implications for a system of general education. According to Anderson, this "marks the beginning of the manual training movement". This book provided an insightful and interesting background to the development and integration of industrial arts into the mainstream of public education.

Phillips, K. "A Progression of Technology in Industrial Arts Education." Technology Education: A Perspective on Implementation. Reston, Virginia: International Technology Education Association, 1985. ERIC Document Reproduction Services No. ED 305506.

A review of the history of hand skill development, manual training, manual arts, industrial arts, and the transition to technology education was traced in chronological order. Phillips followed the major developments in the United States, including the impact of the Russian system and the Sloyd Movement on the development of practical arts education in this country in the 1800's. The importance of the Smith-Hughes Act of 1917-18 and the 1934 American Vocational Association (AVA) release of "Standards of Attainment in Industrial Arts Teaching" was covered. "A Curriculum to Reflect Technology" was presented at the 1947 Conference of the American Industrial Arts Association which was the first attempt to reflect the five broad areas of technology (communications, construction, power, transportation and manufacturing). Other innovative curriculum developments covered included the Jackson's Mill Industrial Arts Curriculum Theory. The author concluded the paper by showing some common elements of the industrial arts/technology curriculums currently being implemented across the United States and noted how to further advance this change. This paper offered a historical perspective and confirmed that for industrial arts to be an effective element in the curriculum it must have the ambition to grow and change with the needs of society.

Barella, R. and T. Wright, eds. An Interpretive History of Industrial Arts: The Interrelationship of Society, Education, and Industrial Arts. 30th ACIATE Yearbook. Bloomington, Illinois: McKnight, 1981.

This yearbook revealed the historical perspective of industrial arts in the mainstream of the American public school. The central theme of the book attempted to relate how industrial arts reacted or failed to react to changes in education and society. The emphasis was an interpretive rather than sequential history of industrial arts. The book described the reactions of the educational institutions to the demands of a transient society and identified the impact of educational innovators and leaders as they perceived society's needs for basic, general, and specialized educational programs. It provided an interesting insight into the origins of industrial arts education and succeeded in pinpointing the need for the program to expand to suit the demands of a changing society.

Warner, W.E. Policies in industrial arts education. Columbus: The Ohio State University Press, 1928.

This dissertation involved researching the policies regarding industrial arts education of several school districts in the state of Ohio in the 1920's. Warner surveyed teachers, administrators, and compared course offerings throughout the state. His study noted that there was confusion in name and content. 358 shop and drawing teachers were asked questions regarding their program offerings. The teachers listed 28 different names for their instructional programs and concluded that "not only is there confusion in terminology, but there is too much haziness with reference to the character of work to be expected." This study illustrated that the need for clarity and direction within the profession is long-lived.

Luetkemeyer, Joseph F. "The Root of a Discipline: Industrial Arts/Technology Education." The Journal of Epsilon Pi Tau 10.1 (Spring 1984): 22-26.

This article focused on the definitions dilemma in the field regarding the shift from industrial arts to technology education. Luetkemeyer pointed out that professionals have had difficulty reaching agreement even on definitions and this linguistic breakdown could result in a fragmentation of professional communication. The history of industrial arts was reviewed, noting that there has been a continuing debate on the nature of the contents and appropriately descriptive name since the 1800's. Through his historical review, Luetkemeyer reached the conclusion that the terms industrial arts and technology are different. He concluded that "any formal program entitled Technology Education would be academic in nature, operating within the traditional classroom setting," and recommended that further serious study is needed before such a shift in philosophy is decided. Thus this article highlighted the debate of educators in terms of both linguistics and concepts, and illustrated the need for unity in definition and concept before acceptance in the field can occur.

Micheels, William J. Come Monday Morning. Washington, D.C.: American Industrial Arts Association, 1978.

In this paper presented to the American Industrial Arts Association Micheels identified the different rationales for including industrial arts programs into the school curriculum. He did not evaluate their effectiveness with students; he instead identified their existence. These reasons included: historical/common heritage, learning-by-doing, skill-for-skill's sake, industry-technology, creativity/problem-solving/design, career awareness, utilitarian-handyman, special needs-learners. Micheels noted that "from teacher to teacher, school to school, city to city, state to state there is a diverse multitude of activities...with some standardization here and there, but ...diversity in detail." He concluded that industrial arts, in an attempt to become a more viable program, has become so diversified in its thinking that the profession has lost its sense of mission. He also cited that communication channels between and within the ranks of the profession have been severed and will need to be reestablished for unified progress to occur. This study again confirmed that there was no clear sense of direction in the field prior to 1980 and this lack of unity caused stagnation.

Dugger, W. E., et. al. Standards for Industrial Arts Programs Project. Report of Survey Data. Revised. Blacksburg, Virginia: Virginia Polytechnic Institute and State University, 1980. ERIC Document Reproduction Services No. ED 198258.

The primary purpose of this study was to establish a data base on industrial arts (IA) programs in the United States. A similar report done by Schmitt and Pelley (1966) was used as a comparison for some of the newly collected data. The study was conducted by surveying industrial arts chairpersons, principals, and guidance coordinators in 2,235 public schools in the United States. Data was also obtained from state and territorial supervisors of industrial arts regarding their programs. The majority surveyed reported that the major purpose of IA (as it was in the 1966 study) was to develop skills in the use of common tools and machines. Also, it was found that IA remained most closely allied with the general education program for all youth, yet less than one third reported that their schools required any IA courses. 21% of the principals said they thought their schools should require IA for all students. This study indicated that IA is important and complimentary to the general education of all students but not supported in the curriculum. Its findings also noted that IA programs have not experienced any significant growth between 1966 and 1980.

Cox, W.L. and T.B. Young. "State Supervisors' Perceptions of Selected Aspects of the Industrial Arts Program." Man/Society/Technology 40.2 (November 1980): 12-14. ERIC Document Reproduction Services No. EJ 235835.

The authors surveyed 43 industrial arts state supervisors to determine what respondents felt industrial arts/industrial technology's role in the public school should be. Among areas researched were K-12 curriculum, teacher professionalism and role in both general education and vocational education. The research disclosed that most respondents thought industrial arts should play a role in both general education and prevocational education. Respondents indicated that junior high school programs should promote a broad awareness of industry and technology and high school programs should emphasize prevocational and technical content. Among major issues identified by the study were lack of curriculum definition, professional identify and teacher professionalism. The findings showed that administrators have expectations that industrials arts and technical education should play a dual role in fostering general education as well as prevocational preparation. This study confirmed the mixed image of industrial arts educators and the lack of clarity in regard to philosophy and purpose of curriculum.

Bame, A.E. and Miller, D.C. "Philosophical Views." Journal of Industrial Teacher Education 18.1 (1980): 14-21.

This article summarized the findings of a survey involving industrial arts teachers, principals, and guidance coordinators. Its purpose was threefold: to access the current philosophy of the professionals in the field; to compare the current findings with those of the 1966 Schmitt and Pelley Study; and to determine future trends in industrial arts. Bame and Miller concluded that industrial arts continues to be viewed as a program to heighten students' awareness to occupational choices. They found that industrial arts teachers included more technical emphasis in the program than principals and guidance coordinators. They also found an insignificant amount of change has occurred since the 1966 study by Schmitt and Pelley. They concluded that professionals in the field continued to view industrial arts as an addendum to students' educational experiences with little focus on the needs of technology; a program whose purpose was varying in accordance with the views of the respondent. This survey pointed out the debate among educators in the field regarding the philosophy of industrial arts and its content.

Benson, D. "Attitudes of Georgia Comprehensive High School Principals, Counselors, and Vocational Supervisors toward Industrial Arts Education." Ed.D. dissertation. University of Georgia, 1982.

The purpose of this study was to investigate the attitudes of high school principals, counselors and vocational supervisors in Georgia towards industrial arts education and the relationship between these attitudes. 100 randomly selected schools were chosen to participate by answering a 45 question opinion survey. Benson found principals and counselors to have much more favorable attitudes towards the program than perceived by teachers under their supervision. The study indicated that when teachers report difficulty securing funds for supplies and equipment for use in their instructional programs, it is the result of the principals' attitudes toward the existing industrial arts program under his direction. Benson concluded from his study that industrial arts teachers should reassess and reevaluate present programs relative to the needs of students, the quality of the program, and the anticipated outcome for students. This study confirmed the need for industrial arts educators to respond to technological growth and the ever-increasing need of students to understand technology.

Bebee, J.F. "A Telephone Survey of Public Attitudes Concerning Industrial Arts Education." Ph.D. dissertation, Ohio State University, 1985.

Bebee conducted a telephone survey of 400 Ohio residents to determine their attitudes towards industrial arts, its importance in the curriculum and the content that should be included in the industrial arts curriculum. The study found overwhelming support for inclusion of all industrial arts content, especially that related to consumerism and career awareness and greater support for the "know" component than the "do" component of industrial arts. The study showed support for technology studies to be of equal importance to science studies and support for including more study of technology. These findings could prove to be of significance if one assumes that the public often influences the administration of public school programs, and indicated that the public does support and find value in industrial arts.

Schoonmaker, W.E. "The Relationship between Selected Factors and the Enrollment of College-Bound Students in High School Industrial Arts Courses." Ph.D. dissertation, University of Minnesota, 1982.

This doctoral study investigated a range of factors that might influence the enrollment of students in industrial arts courses. A questionnaire was administered to 230 male and female first semester freshmen at Kent State University. Schoonmaker attempted to analyze the major characteristics of industrial arts teachers, courses, and laboratories and determine the relationship between students' attitudes towards these characteristics and enrollment in elective industrial arts classes. In addition, the relative influence of students' parents, peers, teachers and other adults on their enrollment in industrial arts was investigated. This study showed that both male and female attitudes were formed by the same general factors. Participation was found to be the strongest attitudinal factor toward the general subject field. "Lack of general interest" and "No time in the student's schedule" were found to be major reasons for not participating. It was found that industrial arts teachers were perceived as not challenging to academic students and that these same students felt industrial arts course work may be somewhat irrelevant to the rest of their lives. This study illustrated the need to demonstrate to students that technology is an ever-increasing influence on their lives and that IA courses will help them understand the challenge of technology.

McMillan, J.H. "Factors affecting the development of pupil attitudes toward school subjects." Psychology in Schools 13 (1976): 322-25.

The research was funded by the National Institute of Education and Reviewed the literature related to the formation of student attitudes toward school subjects. The author synthesized the findings of 75 studies and found that the variables affecting the formation of attitudes toward school subjects could be grouped into four general classifications: 1) Prior attitudes or the initial attitudes the pupils bring to the subject, 2) The attitude and enthusiasm of the teacher toward the subject, 3) Classroom climate, including the physical environment in which the subject is taught, 4) The degree to which classroom activities are enjoyable, challenging, and relevant. These findings supported studies of students' attitudes towards industrial arts classes. In particular McMillan pointed out that prior attitudes of the student toward the subject, the physical environment in which the class is taught, the degree to which the subject is considered to be relevant to the student's future endeavors, and the amount of challenge which students perceive the subject offering all are attitudinal factors which affect enrollment in industrial arts courses. The synthesis of this research illustrated the need of industrial arts to articulate its new posture regarding technology and emphasize the challenges that technology holds for the future of all.

Erekson, T. and R. Nauman. Final Report: Gifted and Talented Students in Vocational Education: A Policy Study. Springfield: Illinois State Board of Education, Department of Adult, Vocational and Technical Education, 1984.

This study summarized the findings of a survey of directors of gifted education in Illinois. The conclusions strongly suggested the presence of an anti-vocational education bias in the counseling of gifted students. 89.3% of the directors surveyed "strongly agreed" or "agreed" that gifted students were counseled away from vocational education courses (including industrial education) despite expressed interest. 46.5% "strongly agreed" or "agreed" that the inclusion of industrial and vocational education in the programs of gifted students is rare. This study also noted that cooperation among professionals in the fields of gifted education, guidance and counseling, and industrial education was not a widely used practice in the state of Illinois. Only 16.4% of 433 vocational directors indicated that there were any types of cooperative efforts. These findings confirmed the attitudinal changes towards industrial arts that must occur within education before its program offerings are accepted as important and necessary for all students.

Bonfadini, J.E. Study to Determine the Benefits of Industrial Arts Instruction on Secondary Students in Virginia. Final Report (1 July 1980--30 June 1982). Richmond: Virginia State Department of Education, 1982. ERIC Document Reproduction Services No. ED 226214.

This report presented the findings of a survey administered to 883 parents, 1,662 industrial arts students, 275 industrial arts teachers, and a majority of industrial arts supervisors and teacher educators in the state of Virginia. Respondents were requested to evaluate instructional elements as related to industrial arts objectives in terms of relative priority. Results indicated that students, parents, and teachers ranked the objectives almost identically. Their first choice indicated the importance of elements associated with tools and machines. Occupational information was second priority for this group. Technical culture and consumer information was of medial range concern for this group. All groups agreed that elements associated with leisure time and problem-solving were of lesser degree of importance. Teachers and supervisors highly ranked the elements dealing with technology and culture. This finding indicated a discrepancy in philosophy and instruction. Teachers favored technical literacy at the expense of practical experience using machines and tools. Survey results also noted that teachers, students, and parents seemed to be in favor of traditional arts values, with technology emphasis important at some level of instruction but not highly ranked or clearly identified. These findings reaffirmed the debate in the field between traditional "shop" classes and the need for a philosophical change toward technology.

Snyder, J.F., and J.F. Hales, eds. Jackson's Mill Industrial Arts Curriculum Theory. Charleston: West Virginia Department of Education, 1981.

This document resulted from a symposium attended by 21 leading American industrial arts/technology educators in 1981. The purpose of this symposium was to provide rationale and direction for the future of industrial arts. The document stated the "focus of industrial arts programs has often been reflected more in the physical setting rather than in a well defined philosophical statement and systematic analysis of content." This document was designed to give states a starting point from which to develop their own industrial arts/technology education curriculum. It was determined that industrial arts was drawn from four subsystems (manufacturing, construction, communication, and transportation) that operate on input-process-output of each component. The document was meant to be a foundation for reconstruction of IA and a building block toward technological literacy in the United States. It has become the foundation for many state curriculums that have been rewritten using the Jackson's Mill basic rationale and content, all of which changed their names to include technology in the title. This document was instrumental in eliciting philosophical change and providing unified direction to industrial arts programs across the United States.

Fisher, Robert. "Good-bye industrial arts...hello tech ed..." The Wisconsin Vocational Educator 8.1 (Winter 1984): 10,21.

This article summarized the preliminary findings of a pilot project in the Rice Lake Schools. In 1981 the Department of Public Instruction's vocational evaluation produced 13 findings that dealt with curriculum needs and showed that Rice Laked lacked a coordinated industrial arts program. As a result of these findings a program model was developed by the Rice Lake technology education staff which adopted the cluster concept in teaching technology. Students from grades 7-9 were involved in the initial implementation (7th grade--"Exploring Technology", an exploratory survey course; 8th grade--"Manufacturing", an 18-week course where students study industry and design, produce, and market a product; 9th grade--a full year course divided into four sections: "Materials and Process," "Communications," "Power and Energy," and "Research and Development". The second phase involved the introduction of new high school courses including a "Skill Work Program" which provided students with the opportunity to gain a better understanding of the current industrial environment within their own community. Preliminary findings indicated that student enrollment increased dramatically in both males and females the year after inception. This project illustrated the results of one district experiencing successful transition from industrial arts to technology education.

Maley, D. and K.N. Starkweather, eds. The Contributions of Industrial Arts to Selected Areas of Education ACIATE 31st Yearbook. Washington, D.C.: American Council on Industrial Arts Teacher Education, 1982. ERIC Document Reproduction Services No. ED 272631.

This yearbook consisted of 14 articles written by leaders in the field and dealt with the contributions of industrial arts to selected areas of education. A comprehensive review of topics including the education of students with special needs, reading, career education, consumer education, economic education and the education of the gifted. The articles contained in this yearbook have significance for they illustrated the far reaching contributions that industrial arts can have to assist in meeting the educational needs of all students and how many disciplines can be furthered within the context of industrial arts instruction.

Dugger, W. E., et. al. "Results of the Second Annual Survey of Industrial, Technical, and Vocational Teachers." Technology Teacher 46.1 (September-October 1986): 9-14.

This survey was conducted by the International Technology Education Association (ITEA) and the Virginia Polytechnic Institute and State University (VPI). It centered around three major areas: information about those who responded, data concerning the schools and programs in the field, and opinions about strengths, weaknesses and problems of the profession. 571 professionals responded from 47 states with 81.2% of them being classroom teachers. 79.7% were technical education teachers. Respondents indicated which course offerings were showing a growth or loss in enrollment. Many of the courses showing losses those among the major categories of crafts, metals, woodworking and other classes dealing with specific materials. The courses that centered on technology showed the greatest growth including robotics, communications, American industry, and general technology. Thus this study showed the growing interest for technology courses over the general and more traditional industrial arts classes.

SUMMARY

The history of the development of industrial arts in American public schools revealed many leaders in the field. Woodward's Manual Training in Education served as a valid introduction for manual training in the public schools. He felt that traditional education in the 1800's was missing an essential element--manual education--and, having become acquainted with Della Vos' Russian system for engineers, was motivated to establish the Manual Training High School. Woodward's school was separate from the local high school and remained so until the comprehensive high school evolved. Woodward felt that students were "altogether unprepared for the work which perhaps he was born to do...and those who directed, or should have directed, his education cannot be held blameless" (141). He believed that education was dealing too exclusively with the abstract and remote and not enough with the concrete and the present (879). The success of Woodward's school prompted controversy among conservative educators who did not see value in manual training and believed that such "useful practical studies" belonged only in trade schools (881). Woodward never advocated manual training as trade training. He believed that manual training relied heavily on conscious study of "the arts", general elements that underlie all industrial pursuits (Anderson 156), whereas trades incidentally taught these concepts.

Woodward was not the only catalyst for a movement toward manual training in the United States. According to Anderson, in 1876 John Runkle (President of the Massachusetts Institute of Technology) was exposed to the Russian system of training engineers and used this as a model for a systematic approach in teaching the arts in general education. Anderson marks this discovery as the "beginning of the manual training movement" (161).

Gustaf Larsson's arrival in 1888 marked another shift in the history of industrial arts. According to Phillips, Larsson was a leader in the Sloyd teacher education movement, a Swedish training system (16). Phillips marked the Swedish Sloyd system and the Russian approach as the basis upon which American manual training rested (16). The publishing of John Dewey's The School and Society led to further examination and change in the manual arts movement. Dewey focused on industry and the impact that industrial growth had on society. He clearly stated that the study of industry provided strong social implications which were central to the educational process. By doing so he stimulated professionals in the field to reevaluate manual training's place in the educational system and the term "industrial arts" was born (Barella and Wright).

By 1917 industrial arts education had grown and was experiencing extreme competition between the vocational leadership and the industrial arts leadership. According to

Phillips, the philosophical ideologies were at odds. The industrial arts educators believed that emphasis should be on prevocational skills while others felt that the concepts taught were instrumental to students' general education. With the passage of the Smith-Hughes Act of 1917-18, vocational and trades education received a major boost and gained broad acceptance especially at the seventh-, eighth-, and ninth-grade levels. (Barella and Wright)

According to Phillips, little cooperation was experienced among professionals in the field between World War I and World War II. No clarity could be established regarding objectives nor could agreement be reached on terminology used to describe program offerings (16). William Warner directed the development of the first curriculum that offered direction to industrial arts education. He presented this document at the 1947 Conference of the American Industrial Arts Association. It is viewed as the first attempt to identify the five broad areas of technology as a basis for a unified curriculum. In "A Curriculum to Reflect Technology" the areas of communications, construction, power, transportation and manufacturing were introduced as the primary curricular needs of industrial arts. (Warner 9-14)

Luetkemeyer reaffirmed that industrial arts teachers have consistently had difficulty reaching agreement on the nature of the contents and appropriately descriptive names since the 1800's ("The Root" 23). He concluded that

"technology education" would be a formal program, academic in nature, and that serious study is needed before such a shift in philosophy is decided. Thus the debate, which was evident even in Woodward's day, continued as professionals in the field refused to agree on definitions and course content.

Warner's 1928 survey of teachers, administrators, and course content confirmed the continuing lack of direction in industrial arts contents. He surveyed 358 shop and drawing teachers and found they listed 28 different names for their instructional programs. He concluded by the respondents answers that not only the terminology differed, but there was also differences in the character of the work expected of the students (23). This lack of unity among professionals was also identified by Micheels in a 1977 survey designed to identify the rationales for including industrial arts programs into the school curriculum. The reasons Micheels discovered were as varied as the course titles and definitions of Warner. Ranging from historical heritage, learning-by-doing thinking, skill-for-skill's sake reasoning, industry/technology approach, career awareness rationale, creativity/problem-solving design, utilitarian/handyman approach, special needs learners, Micheels discovered a "diverse multitude of activities...with some standardization here and there, but...diversity in detail" (2-5). He concluded that the profession had lost its sense of mission in its attempt to become a more viable program and that this

has caused channels of communication to be severed (6-7).

Woodward "advocated manual training for all children as an element of general education" and concluded that "we must open new windows... and let every luminous characteristic of modern life shine in upon our school-rooms"(347). In 1980 the Standards for Industrial Arts Programs Project confirmed this need to reflect modern life. It found that industrial arts had remained most closely allied with the general education program, yet only 21% of the principals surveyed reported that their schools required any industrial arts courses. The fear that Woodward expressed in 1889 when he wrote that "the trade tendency is to be guarded against" proved itself to be true by the results of the Standards survey (93). The majority of those surveyed reported that the major purpose of industrial arts was to develop skills in the use of common tools and machines. It was also noted that the industrial arts programs experienced no significant growth since the previous study completed in 1966 by Schmitt and Pelley. The stagnation caused by a breakdown of linguistics and the lack of a unified curriculum was evident.

Cox and Young tried to determine the perceived role of industrial arts in the curriculum. They surveyed 43 state supervisors and found that most respondents believed that industrial arts should play a role in both general education and prevocational education, thereby indicating that the debate started in Woodward's day continued to rage even today

among professionals in the field. The findings also indicated that administrators recognized the lack of curriculum definition and professionalism in their industrial arts staff, thereby confirming the mixed image of industrial arts education.

Bame and Miller conducted a survey which also gave credence to the lack of philosophical unity among professionals in the field. While principals and guidance coordinators viewed industrial arts as a means of achieving a heightened occupational awareness in students, teachers surveyed placed more emphasis on technical skills. Technology education was ignored and Bame and Miller found that educators in the field continued to view industrial arts as an addendum to students' educational experiences. Benson confirmed the need for industrial arts teachers to reassess and reevaluate present programs in his 1982 study. He found that support for programs was directly related to the supervisor's degree of satisfaction and belief in the program. Benson concluded that by improving the quality of professionalism exhibited by the industrial arts teachers and by clearly identifying the anticipated outcomes for students increased support was obtained from supervisors.

Bebee found overwhelming public satisfaction and belief in the inclusion of industrial arts education in his 1985 study. He surveyed 400 Ohio residents to determine their attitudes towards industrial arts. His findings indicated

that the public desired inclusion of all industrial arts content, especially that related to consumerism and career awareness. His respondents echoed the words of Woodward in desiring the "know" components rather than the "do" components of the curriculum, thereby supporting the philosophical shift necessary to establish technology education. The Ohio residents surveyed indicated that they supported the inclusion of technology studies to be of equal importance to science studies.

Consideration must be given, then, to the effects of industrial education as it relates to students' attitudes. Schoonmaker considered this element in his 1982 study. He investigated the range of factors that influenced students' enrollment in industrial arts courses. He found that participation was the most influential factor. The major reasons for non-participation were students who "lacked interest" or "had no time in their schedules" (2). Schoonmaker also found that industrial arts teachers were perceived as not challenging to academic students and the course work was viewed as irrelevant to these same students' lives (2). McMillan's study indicated that students' prior attitudes and the degree to which classroom activities were viewed as enjoyable, challenging and relevant affected enrollment in subjects. These findings portentously predicted the outcomes of Erekson and Nauman's report involving gifted student's involvement in industrial arts

courses. In a survey of directors of gifted programs Erekson and Nauman found that 89.3% agreed that gifted students were counseled away from vocational education courses despite expressed interest by students. These directors confirmed that gifted students rarely enrolled in industrial arts programs. The findings of this survey blamed the lack of cooperation between gifted education, guidance and counseling, and industrial education for this negative enrollment figure, once again confirming that attitudinal changes must occur among professionals in the field before industrial arts can experience growth.

The need for a clearly defined philosophy was also noted in a study by Bonfadini. His survey involved 883 parents, 1662 industrial arts students and 275 industrial arts teachers in the state of Virginia. The element his respondents found to be the most important to industrial arts programs was that involving tools and machines. Occupational information was the second priority for this group, with technical culture and consumer information of medial range concern. Thus the findings of Bonfadini confirmed that the public perception of industrial arts courses had not shifted considerably away from its emphasis on skills training.

Snyder and Hales reported that the Jackson's Mill Industrial Arts Curriculum Theory was meant to give states a starting point from which to develop their own technology program. The document was intended to be a foundation for

reconstruction of the industrial arts curriculum into the four areas of technology--manufacturing, construction, communication and transportation. The 21 national industrial arts leaders who formulated this document hoped it would be instrumental in eliciting philosophical change and providing unified direction to programs across the United States (Dugger, et.al., Standards 3-9).

In the Second Annual Survey of Industrial, Technical, and Vocation Teachers conducted in 1986, it was found that 79.7% of the respondents were technology teachers. This figure provided credence to the Jackson's Mill document and increased hopes that a more unified philosophy was attainable. The respondents to this survey also indicated that traditional industrial arts courses had experienced a decrease in enrollment while the courses that centered on technology (including robotics, communications, American industry, and general technology) showed the greatest growth (12-14).

A pilot project was developed in 1981 in the Rice Lake Wisconsin Schools. The Department of Public Instruction conducted a vocational evaluation and as a direct result of the findings, a program model was developed by the technology staff. The curriculum involved grades seven through nine and included courses titled "Exploring Technology", "Manufacturing", "Materials and Process", "Communications", "Power and Energy" and "Research and Development" (Fisher

10). Preliminary findings indicated that student enrollment increased dramatically in both males and females and the teachers involved indicated they enjoyed teaching the new course contents (Fisher 21).

The literature involving industrial arts provided an insightful perspective into the current philosophical debate involving the Jackson's Mill Industrial Arts Curriculum Theory (Luetkemeyer; Barella and Wright; Woodward; Phillips). The recent studies in the field indicated the need for professionals to develop a unified philosophy and curriculum in order to achieve the technology education needed for the 21st century (Micheels; Dugger; Cox and Young; Erekson and Nauman), and that the perception of industrial arts must change before support can be meaningfully increased (Fisher; McMillan; Schoonmaker; Bebee; Benson; Bame and Miller).

CONCLUSION

It was evident from the review of historical literature that the debate within the profession regarding definition, curriculum, and philosophy is of long-standing significance (Woodward; Phillips; Barella and Wright). The industrial arts movement experienced controversy from its inception in the late 1800's and continues to experience difficulty maintaining a creditable stature within the general education program even today. The need for educators in the field to evaluate and rededicate themselves to what Woodward identified as a "new education" that could respond to the

conditions of a changing society was the predominant conclusion by most of the leading experts in the field today (Wright; Dugger, et.al.; Snyder and Hales; Bonfadini; Maley and Starkweather; Warner). It was apparent that without this unity within the profession technology education as outlined in the Jackson's Mill Industrial Arts Curriculum Theory will fail to achieve the intended impact, and for most educators the shift will be an artificial name change only (Dugger, et.al., "Results of the Second Annual Survey"). At this point the research was inconclusive as to its impact on curriculum and philosophy, although students involved in the new technology curriculum indicated satisfaction, challenge and relevancy to their lives (Fisher; Dugger, et.al., "Results").

RECOMMENDATIONS

It is recommended that:

1. A technology program should be included in the general education curriculum that provides technological literacy for all students in the school in order to prepare them for the challenges of living in a society based on ever-changing technology.
2. All professionals in the field should renew their commitment and dedication to the profession to insure that industrial arts/technology education takes its rightful place in the total school curriculum.
3. As states' curriculums shift from industrial arts to technology education, educators in the field should conform to their state's curriculum plans and work to achieve technology education and not merely provide students with a unit shop that has been artificially renamed.
4. Industrial arts/technology educators must work to achieve professionalism in their demeanor in order to enhance the perceptions of supervisors, administrators, students and the public and foster the image that technology education is a viable, worthwhile endeavor.

5. Continuing study involving the curriculum changes across the United States should be pursued in order to provide guidance and direction for the future of technology education.

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